

WHAT IS CLAIMED IS:

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1. A storage device, comprising:  
a disk medium;

a recording and reproducing head that  
floats over the disk medium and records or  
10 reproduces information in the disk medium;  
an actuator that supports the recording  
and reproducing head and moves the recording and  
reproducing head in a radial direction of the disk  
medium;

15 a driving unit that drives the actuator;  
a speed detection unit that detects a  
moving speed of the actuator;

a speed control unit that controls the  
moving speed of the actuator by a feedback control  
20 based on a difference between a detected moving  
speed of the actuator and a target speed;

a ramp member arranged outside the disk  
medium used for loading and unloading the recording  
and reproducing head;

25 a position detection unit that detects a  
position of the recording and reproducing head; and

a position determination unit that  
determines whether the detected position of the  
recording and reproducing head reaches a first  
30 predetermined position in operations of loading or  
unloading the recording and reproducing head,

wherein

the speed control unit comprises one of a  
bandwidth switching unit that switches a bandwidth  
35 of the feedback control to a wide bandwidth based on  
a result of the position determination, and a feed-  
forward compensation unit that adds a predetermined

feed-forward control variable to a control variable of the feed-back control based on the result of the position determination.

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2. The storage device as claimed in claim 1, wherein:

10           when the position determination unit determines that the position of the recording and reproducing head reaches the first predetermined position, the bandwidth switching unit switches the bandwidth of the feedback control to the wide  
15           bandwidth, or the feed-forward compensation unit adds the predetermined feed-forward control variable to the control variable of the feed-back control.

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3. The storage device as claimed in claim 1, further comprising a speed change determination unit that determines whether the speed difference  
25           exceeds a predetermined value when the position determination unit determines that the position of the recording and reproducing head reaches the first predetermined position,

          wherein:

30           if the speed change determination unit determines that the speed difference exceeds the predetermined value, the bandwidth switching unit switches the bandwidth of the feedback control to the wide bandwidth, or the feed-forward compensation  
35           unit adds the predetermined feed-forward control variable to the control variable of the feed-back control.

5                   4. The storage device as claimed in claim  
1, wherein:

                  in the operation of unloading the  
recording and reproducing head, the first  
predetermined position includes a position where the  
10 recording and reproduction head is nearly in contact  
with the ramp member.

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                  5. The storage device as claimed in claim  
1, the ramp member including:

                  a slope portion having a surface inclined  
relative to a surface of the disk medium, said slope  
20 portion raising the recording and reproducing head  
away from the disk medium in the operation of  
unloading the recording and reproducing head; and

                  a flat portion parallel to the surface of  
the disk medium and connected to the slope portion;  
25 wherein

                  in the operation of loading the recording  
and reproducing head, the first predetermined  
position includes a position at a boundary of the  
slope portion and the flat portion.

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                  6. The storage device as claimed in claim  
35 1, wherein:

                  the position detection unit detects the  
position of the recording and reproducing head by

calculating a distance from a reference position to the position of the recording and reproducing head.

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7. The storage device as claimed in claim 6, wherein:

10 the position detection unit calculates the distance by integrating the moving speed of the actuator detected by the speed detection unit.

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8. The storage device as claimed in claim 6, further comprising a position displaying unit that displays the position of the actuator,

wherein:

20 the position detection unit calculates the distance by using the position of the actuator displayed in the position displaying unit.

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9. The storage device as claimed in claim 8, wherein:

30 the position displaying unit includes one of a rotary encoder mounted on the actuator and an optical scale mounted on the actuator.

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10. The storage device as claimed in claim 6, wherein:

the reference position includes a position where the actuator is mechanically limited and mechanically stopped.

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11. The storage device as claimed in claim 6, wherein:

10 the disk medium is a magnetic disk medium;  
and

the reference position includes a predetermined cylinder position based on servo information recorded in the magnetic disk medium.

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12. The storage device as claimed in claim 11, wherein:

20 the predetermined cylinder position is a position of a cylinder at the periphery of the magnetic disk medium.

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13. The storage device as claimed in claim 12, wherein:

30 the cylinder at the periphery of the magnetic disk medium is the outermost cylinder of the magnetic disk medium.

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14. The storage device as claimed in

claim 1, wherein:

a second predetermined position is provided;

and when the position determination unit  
5 determines that the position of the recording and reproducing head reaches the second predetermined position, the bandwidth switching unit switches the bandwidth of the feedback control to a narrow bandwidth, or the feed-forward compensation unit  
10 stops adding the predetermined feed-forward control variable to the control variable of the feed-back control.

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15. The storage device as claimed in claim 14, the ramp member including:

a slope portion having a surface inclined  
20 relative to a surface of the disk medium, said slope portion raising the recording and reproducing head away from the disk medium in the operation of unloading the recording and reproducing head; and

a flat portion parallel to the surface of  
25 the disk medium and connected to the slope portion; wherein

in the operation of unloading the recording and reproducing head, the second predetermined position includes a position at a  
30 boundary of the slope portion and the flat portion; and

in the operation of loading the recording and reproducing head, the second predetermined position includes a position where the recording and  
35 reproducing head is substantially out of contact with the slope portion.

16. A method of controlling movement of  
5 an actuator that supports a recording and  
reproducing head floating over a disk medium and  
recording or reproducing information in the disk  
medium, moves the recording and reproducing head in  
a radial direction of the disk medium, and loads or  
10 unloads the recording and reproducing head by using  
a ramp member arranged outside the disk medium, the  
method comprising the steps of:  
detecting a moving speed of the actuator;  
controlling the moving speed of the  
15 actuator by a feedback control based on a difference  
between the detected moving speed and a target  
speed;  
detecting a position of the recording and  
reproducing head in operations of loading or  
20 unloading the recording and reproducing head;  
determining whether the detected position  
of the recording and reproducing head reaches a  
predetermined position; and  
switching a bandwidth of the feedback  
25 control to a wide bandwidth or adding a  
predetermined feed-forward control variable to a  
control variable of the feed-back control based on  
the result of the position determination.

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17. The method as claimed in claim 16,  
wherein:  
35 the step of switching is executed when it  
is determined that the detected position of the  
recording and reproducing head reaches the

predetermined position in the step of determining.

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18. The method as claimed in claim 16,  
further comprising, after the step of determining  
and before the step of switching, a step of  
determining whether the speed difference exceeds a  
10 predetermined value when it is determined that the  
position of the recording and reproducing head  
reaches the predetermined position,

wherein:

the step of switching is executed when it  
15 is determined that the speed difference is greater  
than the predetermined value.